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Nebraska Agricultural Water Management Network Stakeholder handout

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The Nebraska Agricultural Water Management Network



Water is the life support of irrigated and rain-fed agriculture and economy of Nebraska and other Central Plains and mid-western states. Nebraska's approximately 8.8 million acres of irrigated lands are extremely vital to the state's economy with an approximate five billion dollars per year of revenue.

Withdrawal of fresh water resources for irrigation in Nebraska represents the largest of the state's water pumping demands. Irrigated agriculture consumes more than 90 percent of groundwater pumped in Nebraska (*Irmak et al., 2010*).

Collaborating to maximize the net benefits of irrigated crop production is of growing importance in Nebraska as we need to produce more food with less water. Many areas in the state are involved in significant management changes to conserve irrigation water.

The **Nebraska Agricultural Water Management Network (NAWMN)** established a system in early 2005 for testing cutting-edge irrigation management technologies. The Network includes growers, UNL Extension, Natural Resource Districts, the Natural Resource Conservation Service, crop consultants and other interested partners — all key to the adoption of water and energy efficiency measures.

From its inception to 2011, the NAWMDN has grown to over 700 participants — it's no longer a demonstration, it's a network (NAWMN)!



The NAWMN was designed to encourage farmers to adopt newer technologies associated with water and energy resources in irrigated crop production. Education and information about the use of appropriate technologies are delivered to agriculture professionals and irrigators through field demonstrations, the website, and educational meetings.

History and Goals....

The NAWMN partnership in 2005 between UNL Extension, the Upper Big Blue Natural Resources District, and growers from south central Nebraska expanded to include the state Natural Resources Conservation District (NRCS) in 2006. The demonstration projects started in the Upper Big Blue NRD were extended to other parts of the state in 2007.

The goal of the NAWMN is to transfer high quality information to Nebraska producers through a series of demonstration projects established in farmers' fields, and to implement newer tools and technologies to enhance crop water use efficiency and energy savings.

We believe that this interdisciplinary demonstration project:

- increases the adoption of appropriate newer technologies and methods to obtain higher crop water use efficiency on a field scale.
- enhances communication and information exchange between farmers, research faculty, academics, NRCS, UNL Extension, NRDs, and other state and federal agencies.
- promotes water conservation.

The NAWMN is working hand-in-hand with growers and crop consultants on strategies on how to achieve efficiency through a series of field demonstrations, initiated in the Upper Big Blue NRD in south central Nebraska. The demonstration project is supported by the extensive research projects conducted on newer technologies at the South Central Agricultural Laboratory (SCAL) near Clay Center, Nebraska by Suat Irmak. Dr. Irmak has been conducting research on the accuracy, durability and other operational characteristics of ET-based ET gages and Watermark sensors since April 2004.



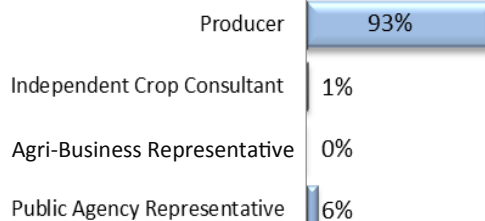


In 2010, 506 NAWMN participants were surveyed to measure the Network's impact.

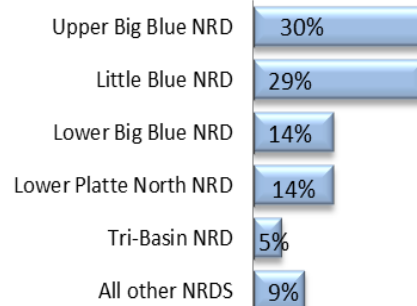
Survey respondents reside in 36 counties across Nebraska.

They were asked to identify their interest in reducing inputs such as energy costs, water usage, improving irrigation efficiency, networking with other producers, practicing irrigation management and increasing knowledge of irrigation management technologies.

Which of the following do you consider your PRIMARY occupation?



Which NRD do you reside in? Responses from 36 counties were received.



WHY NAWMN?

"I feel that this program has saved us more irrigation water & fuel than anything!

We are 150% sold on it. Use it on all 20 of our pivots !"

"I am generally interested in reducing inputs such as energy costs, water, etc."

"I want to improve irrigation efficiency in my operation."

"I have heard about irrigation management technologies and I'm interested in learning more about them."

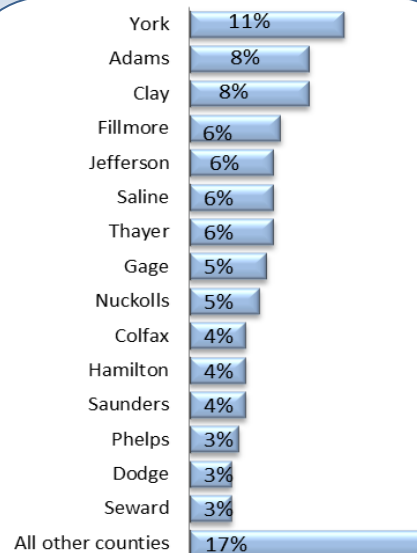
Who have we reached?

Survey respondents **are** involved in NAWMN:

- 3 or more years 58%
- 2 years 26 %
- first year 16 %

Age demographics:

- 21-40 years old 17%
- 41-60 years old 63%
- 61 years or older 21%



What is the benefit of NAWMN?

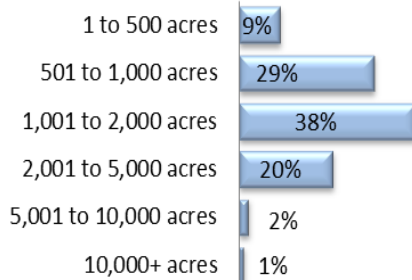


The Nebraska Agricultural Water Management Network (NAWMN) coordinated by UNL Extension began in 2005 with 15 collaborators. Annual participant surveys showed average irrigation water savings of 2.0" for corn and soybean consistently for six years resulting in total energy savings of at least \$2,142,000 and \$1,313,000 for corn and soybean, respectively.

As of 2011, the number of active growers who joined the Network has increased to more than 700. The irrigated acreage that was represented by the NAWMN producers increased from 1,482 acres in 2005 to 342,250 acres in 2010 (212,660 acres corn and 130,340 acres soybean).

Due to the information and strategies taught in the NAWMN, participants are changing their behaviors of how they manage irrigations and the NAWMN is having significant impacts in terms of conserving water and energy resources statewide.

Producers please indicate the number of cropland acres you manage or influence annually.



	#	%
1 to 500 acres	17	9%
501 to 1,000 acres	56	29%
1,001 to 2,000 acres	73	38%
2,001 to 5,000 acres	39	20%
5,001 to 10,000 acres	4	2%
10,000+ acres	2	1%

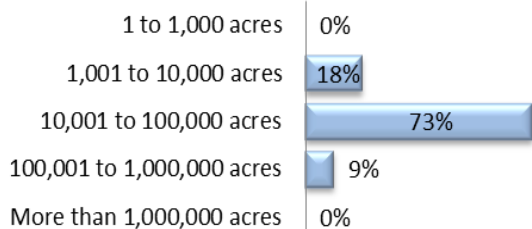
Total acres represented

342,250 acres

Total respondents to this question

191

Consultants please indicate the number of cropland acres you manage or influence annually.



	#	%
1 to 1,000 acres	0	0%
1,001 to 10,000 acres	2	18%
10,001 to 100,000 acres	8	73%
100,001 to 1,000,000 acres	1	9%
More than 1,000,000 acres	0	0%

Total acres represented

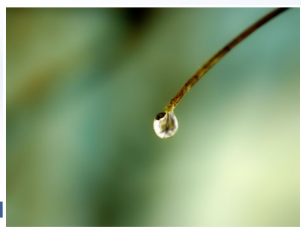
333,667 acres

Total respondents to this question

11

Actual acres reported by consultants, representative or others totaled 1,001,000.

*The final figure assumes the likelihood of a three-fold duplication of acres due to the same acres being reported by multiple participants.



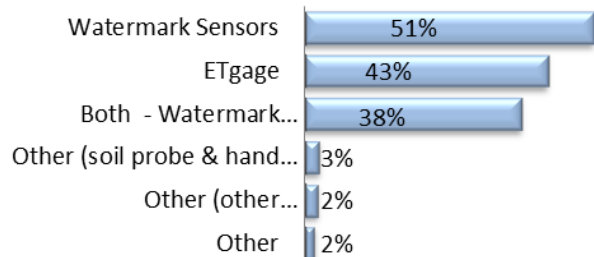
When asked if using the equipment or the NAWMN information influenced growers on the amount of irrigation water applied, 97% of the respondents said ‘yes’.

Suat Irmak, UNL Soil and Water Resources Irrigation Specialist, and Extension Educators from UNL Extension and Upper Big Blue NRD (UBBNRD) personnel developed a partnership to initiate the Network and install ETgages and Watermark sensors in producer’s fields to teach producers strategies for water and energy conservation. Due to the success of the Network, the UBBNRD cost shared with producers and consultants for the equipment in 2006. This became the pattern in successive years as more partners joined with equipment cost-share coming from other NRD’s. A grant was obtained from the USDA to allow for expansion of the NAWMN statewide.

Two primary tools adopted initially in the Network are **ETgages** and **Watermark sensors**. The ETgage is used to estimate crop water use from reference evapotranspiration and crop coefficient information. The Watermark sensors are used to monitor available water in the crop root zone over time. The Network participants learn how to utilize these tools to make better-informed decisions in their irrigation management operations.

In addition to the demonstration projects, the information is shared and delivered to Network participants and others through field days, seminars, workshops, outreach publications, media reports, refereed journal articles, etc.

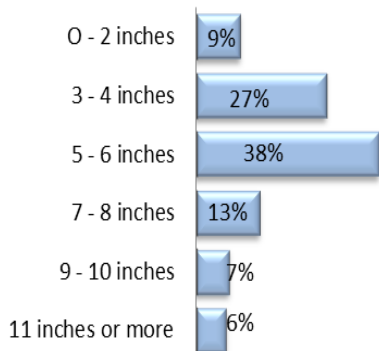
Check the equipment that you utilized this season to schedule irrigations.



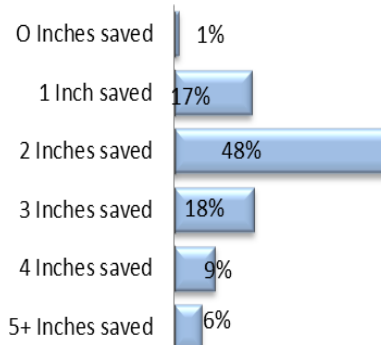
	#	%
Watermark Sensors	189	51%
ETgage	159	43%
Both - Watermark Sensors & ETgage	142	38%
Other (soil probe & hand feel)	10	3%
Other (other sensors/loggers)	9	2%
Other	7	2%

Technology is assisting growers to reduce inputs such as energy costs, water usage, improving irrigation efficiency, and networking with other producers practicing irrigation management and increasing knowledge of irrigation management technologies.

Estimated inches of water applied to corn in 2010 by respondents:

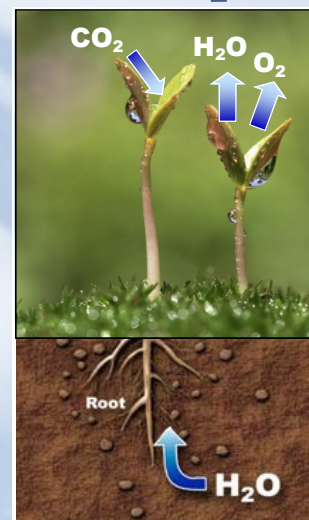


Estimated inches of water saved (inches/acres) in 2010 for irrigating corn by respondents:

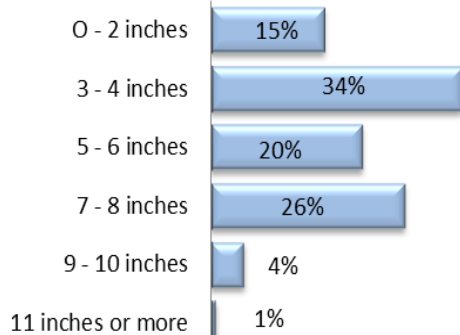


Average inches applied: 5.4"

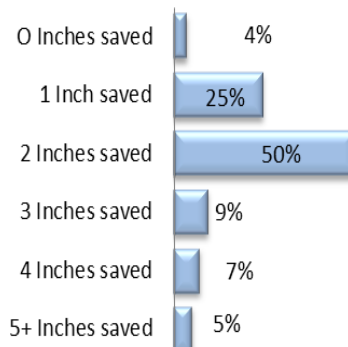
Average savings reported: 2.4"



Estimated inches of water applied to soybeans in 2010 by respondents:



Estimated inches of water saved (inches/acres) in 2010 for irrigating soybeans by respondents:



Average inches applied: 5.4"

Average savings reported: 2.1"



When asked, 98% of the NAWMN would continue to participate.



The NAWMN is continually working to increase its outreach, increasing in 2011, by 200 members. NAWMN is striving to improve and expand. Survey respondents share valuable insights and suggestions to help the program reach a larger audience. In the 2010 survey, respondents made the following suggestions when asked how the NAWMN could be improved and expanded:

Technology - 19 responses

“Continue to monitor and try newer technologies to remain on the cutting edge.”

- Continue your research efforts.
- Look for more automated ways to collect the needed information.
- Look for ways to relay the information to the home computer/Ipad.
- Develop permanent sensor installation protocols.

Website Updates - 7 responses

- Daily Updates on website of ETgage readings.
- Have a different color on ETgages not reporting.
- More timely reporting of ETgage readings.
- Make the website more user friendly.

Training - 13 responses

“Should be required for at least one field for every producer to realize the benefits - maybe incorporate into pesticide certification.”

- I'd like a good pocket-sized, laminated card with the readings on it.
- More than one training session per year.
- More training on tying atmometer with sensors and how to use the two.

Good Program - 14 responses

“We are in a big growth year, we are doubling the numbers of our first three years. It's working for producers and the 1.5 - 2" of water saved is a significant cost item as well as a valuable resource.”

- Keep doing what you are and encourage more producers.
- Keep up the work and continue to refine the program.

Cost Share - 10 responses

“Continue to cost share & provide technical support!”

- Cost sharing on equipment is an excellent way to expand the program.
- Encourage more NRD involvement.

Other - 3 responses

“Over come the “herd instinct” that everyone else is watering then I should too!”

- Mandate all producers that farm 1,000 acres + use this system.

What did survey respondents like the best about the NAWMN program?

Savings - 30 responses

Saving both water and dollars! Saving fuel!
Water conservation - more crop per drop!
Most people know that underwatering a crop hurts,
many don't realize the damage they do by overwatering.

Confidence—19 responses

Knowing!
Taking the guesswork out.
Piece of mind & dollars \$ in my pocket!

Support - 22 responses

Extension & NRD support!
Assistance from Extension Educator.
Help!
One on one support!
Guidance!
Adopting at my pace.

Irrigation Scheduling - 9 responses

Knowing when to start and stop for the season!

New Technology - 22 responses

Information on what's new.
Another tool!

On my farm - 9 responses

Gathering ET data on my farm!
The large area involved & ET readings
next to my crop.
Bring the technology out to the farm and
demonstrating it!
Local ET.

Information & Training - 21 responses

Hands on!
A better source of information!
Being able to use the work of others.
Self help.
My own field trials and experiences!
Forces better records resulting in reduced amount &
improved timing of irrigation.

Program:

- "I feel that this program has saved us more irrigation water & fuel than anything! We are 150% sold on it. Use it on all our pivots!"
- "Could not trust the thing the first year. Now I have confidence in them."
- "This the best program ever for knowing when to irrigate and when not to!"
- "Really appreciated the knowledge gained utilizing this program . Thanks!"
- "Keep up the Great work -- This is a "Premier Irrigation Event"."
- "This a well-run program and can save a lot of our water resources."
- "Great program, state wide would reduce water use."

Training:

- "The program allowed for learning and flexibility to change with conditions and schedule and I the producer had control."
- "I'm not much for meetings. I prefer short sit downs with local extension educator, NRCS and NRD staff."

Research/Technology:

- "Get the sensors compatible with pivot panels so we can check them from our computer."
- "Good concept, we need to go from stone age devices to what's available today!"
- "We need to continue to research the last watering!"

In General:

- "The NRD is requiring flow meters, but it might be more important to know when to irrigated rather than how much you pumped? A combination of both would be good."
- "I've had some great Extension Educator support."
- "For me the ETgage was easier to monitor and read making it a better choice for me."
- "The ETgage doesn't know if I have 36,000 or 25,000 plants/acre, but Watermark sensors do!"

The main goal of the Network is to enable transfer of high quality information to Nebraskans through a series of demonstration projects established in farmers' fields, and to implement newer tools and technologies to enhance crop water use efficiency and energy savings.

Growers, crop consultants, state and federal water regulatory agencies and other interested partners can contact one of the members of the NAWMN if they would like to sign up and be a part of the network and efforts.

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The NAWMN Network Partners:

- Central Nebraska Public Power and Irrigation District (CNPPD)
- Little Blue Natural Resources District
- Lower Big Blue Natural Resources District
- Lower Platte North Natural Resources District
- Nebraska Network of Natural Resources Districts (NRDs)
- Nebraska Natural Resources Conservation Service (NRCS)
- North Platte Natural Resources District
- South Platte Natural Resources District
- Upper Big Blue Natural Resources District
- Upper Niobrara White Natural Resources District



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